UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,314	03/01/2004	Ashok Mantravadi	030213	1802

23696 7590 05/24/2007
QUALCOMM INCORPORATED
5775 MOREHOUSE DR.
SAN DIEGO, CA 92121

EXAMINER	
LEE, SIU M	

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
05/24/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

us-docketing@qualcomm.com
kascanla@qualcomm.com
nanm@qualcomm.com

Office Action Summary	Application No.	Applicant(s)	
	10/791,314	MANTRAVADI ET AL.	
	Examiner	Art Unit	
	Siu M. Lee	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5,14,15,17-19 and 22* is/are rejected.

7)☒ Claim(s) *3,6-13,16,20 and 21* is/are objected to.

8)☒ Claim(s) *23-42* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4, 5, 14, 15, 17, 18, 19, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (US 2002/0088005 A1) in view of Ling et al. (US 2003/0003880 A1).

(1) Regarding claim 1, 14, and 15:

Wu et al. discloses a method of transmitting a base stream of data and an enhancement stream of data (bit stream 1 and bit stream 2 as shown in figure 5) in a wireless communication system, comprising:

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the base stream to obtain a first data symbol stream (bit stream 1 in figure 5 is being modulated in the QPSK mod block), wherein the base stream is designated to be received by a plurality of receiving entities (for mobile receivers could decode a lower quality video signal, paragraph 0059, lines 12-14);

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the enhancement stream to

obtain a second data symbol stream (bit stream 2 in figure 5 is being modulated in the QAM mod block), wherein the enhancement stream is designated to be received by at least one receiving entity (for fixed receivers could decode a higher quality video signal, paragraph 0059, lines 12-14), and wherein the coding and modulating for the base and enhancement streams are not dependent on channel realizations of receiving entities for the base and enhancement streams (the coding and modulating for the base (low priority) and enhancement streams (hi priority) does not dependent on the channel realizations of receiving entities for the base and enhancement streams).

Wu et al. fails to disclose processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas.

However, Ling et al. to disclose a TX MIMO processor (TX MIMO processor 120d in figure 4) that processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams (in figure 4, TX MIMO processor 120d demultiplex the modulation symbol stream into a number of subchannel symbol stream, paragraph 0074, lines 6-8, the modulated symbol stream

S1 is transmitted on one frequency subchannel, processed by a subchannel MIMO processor 412_x and then demultiplexed by a demultiplexer 414_x); processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams (in figure 4, TX MIMO processor 120d demultiplex the modulation symbol stream into a number of subchannel symbol stream, paragraph 0074, lines 6-8, the modulated symbol stream S_K is transmitted on another frequency subchannel, processed by a respective subchannel MIMO processor 412_a to 412_K and then demultiplexed by a demultiplexer 414_a to 414_K), wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams (the processing of the first and second data symbol stream is depending on the channel state information (CSI), such as signal to noise ratio, paragraph 0044, lines 3-7); and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas (the output of the demultiplexer 414_x and 414_a-414_K are combined by the combiner 416 to form a modulated symbol vector for each transmit antenna, paragraph 0074, lines 15-18).

It is desirable to processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the

receiving entities for the base and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas because it can increase the transmission capacity (paragraph 0088, lines 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Ling et al. with the method of Wu et al. to improve the performance.

(2) Regarding claim 2:

Wu et al. further disclose wherein the base stream and the enhancement stream are transmitted for a broadcast service (page 5, claim 9 discloses that the bit streams are for tiered digital broadcasting).

(3) Regarding claim 4:

Wu et al. fails to disclose wherein the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme or the spatial multiplexing scheme.

However, Ling et al. further disclose wherein the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme (the transmit antenna in figure 1 may be used to provide various form of spatial diversity including transmit diversity, paragraph 0024, lines 3-5).

It is desirable to have the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme because it can increase the transmission capacity (paragraph 0088, lines 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Ling et al. with the method of Wu et al. to improve the performance of the method.

(4) Regarding claim 5:

Ling et al. further disclose wherein each of the first and second spatial processing schemes is a transmit diversity scheme (the transmit antenna in figure 1 may be used to provide various form of spatial diversity including transmit diversity, paragraph 0024, lines 3-5).

(5) Regarding claim 17 and 18:

Wu et al. discloses an apparatus comprising:

a first data processor operative to code and modulate a base stream of data to obtain a first data symbol stream (bit stream 1 in figure 5 is being modulated in the QPSK mod block and during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062,);

a second data processor operative to code and modulate an enhancement stream of data to obtain a second data symbol stream (bit stream 2 in figure 5 is being modulated in the QAM mod block and during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062);

Wu et al. fails to disclose a first spatial processor operative to process the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; a second spatial processor operative to process the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams; and a combiner operative to combine the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas.

However, Ling et al. discloses a TX MIMO processor (TX MIMO processor 120d in figure 4) that comprises a first spatial processor operative to process the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams (subchannel MIMO processor 412x and demux 414x in figure 4); a second spatial processor operative to process the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams (DEMUX 410, subchannel MIMO processor 412a to 412k and DEMUX 414a to 414k in figure 4); and a combiner (combiner 416a to 416t in figure 4) operative to combine the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas (the output of the demultiplexer 414_x and 414_a-414_K are combined by the combiner 416 to form a modulated symbol vector for each transmit antenna, paragraph 0074, lines 15-18).

It is desirable to have a first spatial processor operative to process the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; a second spatial processor operative to process the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams; and a combiner operative to combine the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas because it can increase the transmission capacity (paragraph 0088, lines 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Ling et al. with the method of Wu et al. to improve the performance.

(6) Regarding claim 19:

Wu et al. fails to disclose wherein the first spatial processor is operative to perform spatial processing for a transmit diversity scheme, and wherein the second spatial processor is operative to perform spatial processing for the transmit diversity scheme or a spatial multiplexing scheme.

However, Ling et al. further disclose wherein the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme (the transmit antenna in figure 1 (antenna 124a to antenna 124t) may be used to provide various form of spatial diversity including transmit diversity, paragraph 0024, lines 3-5).

It is desirable to have the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme because it can increase the transmission capacity (paragraph 0088, lines 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Ling et al. with the method of Wu et al. to improve the performance of the apparatus.

(7) Regarding claim 22:

Wu et al. discloses a method of transmitting at least two data streams in a wireless communication system, comprising:

coding and modulating each of the at least two data streams to obtain a corresponding one of at least two data symbol streams (bit stream 1 in figure 5 is being modulated in the QPSK mod block and during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062; bit stream 2 in figure 5 is being modulated in the QAM mod block and during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062)

Wu et al. fails to discloses spatially processing each of the at least two data symbol streams in accordance with a selected spatial processing scheme to obtain a set of symbol substreams for the data symbol stream, wherein at least two sets of symbol substreams are obtained for the at least two data symbol streams; and combining the at least two sets of symbol substreams for the at least two data symbol streams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas, and wherein each of the at least two data streams is coded,

modulated, and spatially processed for recovery by receiving entities achieving a different target signal-to-noise ratio (SNR) or better.

However, Ling et al. discloses spatially processing each of the at least two data symbol streams in accordance with a selected spatial processing scheme to obtain a set of symbol substreams for the data symbol stream (for the fist data stream S1, the subchannel MIMO processor 412x and DEMUX 414x process the first data stream, the DEMUX 410, subchannel MIMO processor 412a-412k, and DEMUX 414a-414k process the second data stream, paragraph 0074, lines 10-15), wherein at least two sets of symbol substreams are obtained for the at least two data symbol streams (symbol substreams output by the DEMUX 414x and 414a-414k in figure 4); and

combining the at least two sets of symbol substreams for the at least two data symbol streams to obtain a plurality of transmit symbol streams (the combiner 416a-416t output V1 to VT after the combination, paragraph 0074, lines 15-18) for transmission from a plurality of transmit antennas, and wherein each of the at least two data streams is coded, modulated, and spatially processed for recovery by receiving entities achieving a different target signal-to-noise ratio (SNR) or better (for the transmitter, the data fro each transmission channel may be coded based on the CSI (e.g. the SNR estimation) for the transmission channel, paragraph 0012, lines 7-12).

It is desirable to spatially processing each of the at least two data symbol streams in accordance with a selected spatial processing scheme to obtain a set of symbol substreams for the data symbol stream, wherein at least two sets of symbol substreams are obtained for the at least two data symbol streams; and combining the at

least two sets of symbol substreams for the at least two data symbol streams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas, and wherein each of the at least two data streams is coded, modulated, and spatially processed for recovery by receiving entities achieving a different target signal-to-noise ratio (SNR) or better because it can increase the transmission capacity (paragraph 0088, lines 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Ling et al. with the method of Wu et al. to improve the performance.

Allowable Subject Matter

3. Claims 23-42 are allowed.

4. Claims 3, 6-13,16, 20, 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

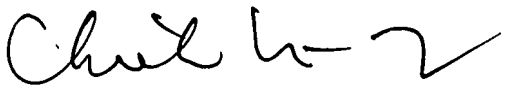
5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Raleigh et al. (US 6,452,981 B1) discloses a spatio-temporal processing for interference handling. Fan (US 2003/0012315 A1) discloses a system and method for multistage error correction coding wirelessly transmitted information in a multiple antennae communication system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Siu M. Lee whose telephone number is (571) 270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Siu M. Lee
5/11/2007



CHIEH M. FAN
SUPERVISORY PATENT EXAMINER